Hardware system for scale:

Strain gauge amplifier

* -powered by +5V ONLY
* Used with 120Ω2 subcircuits: bridge voltage excitation and bridge sensing
* Bridge excitation:
  + Constant voltage: 2.5 V
  + Low temp sensitivity and voltage drift
  + Voltage can be trimmed by +5% using 10K potentiometer
  + Supply = TS921 op amp with source 80mA into 32ohm load 🡺 provide 20mA at 2.5V
* Bridge sensing:
  + High sensitivity and common mode rejection ration (CMRR)
  + Output amplified by U4 (AD623AN amplifier)
  + Has R4 resister (178ohm) with gain 563
* Bridge null:
  + Output = 0 if no load
  + If strain gauge plastically deformed 🡪 large zero shift may be needed 🡪 R3 replaced by lower value resistor or 0 ohm link
* Circuit:
  + (see page 2)
* Adjusting Bridge sense output:
  + With unloaded, adjust VR2 until voltage at TP2 just moves off noise floor (V = 10 or 20mV)
  + See point where changing VR2 no longer decreases voltage at TP2
  + Stop just before above found point
  + Apply load:adjust until satisfactory 1 – 1.2 kg to beam.
  + Adjust VR3 o give desired full scale voltage at TP2 (full scale output in order of 3V depending on load
  + Output U2 saturate at 3.8V 🡪 max output = 3.2V ideally for +5V supply

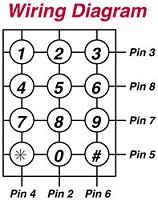
Text to speech board based on Winbond WTS701 speech processor

* Power supply: 2.7V – 3.3V at 35mA operating current.
* Supply from U2 (microchip TC1015-33VCT CMOS low dropout regulator) with input and output capacitors C1 and C2
* Regulator = 100mA output
* Power supply bypass capacitors: C5, C6, C7 and C8
* Need separate digital and analog supplies for good audio
* Implement 5V and buffer U4 sends as 3.3V for digital and analog supply
* Io buffers:
  + Buffer used in event of inadvertent over-voltage through static discharge
  + See logic table page2
* Circuit:
  + All pin1 at top left corner
  + See page 2
  + Power: pin1 = +5V input; pin2 = +0v input
  + See page 3 for digital signal linkages
  + See page 4 for analog signal linkages (includes speaker connections)
* Low power consumption
* 56 pin TSOP package
* Industrial temp range: -40oC to +85oC
* ASCII or Unicode streaming
* Language programmable
* Peripheral control:
  + 16 bit linear PCM clave interface output support
  + SPI serial port for control command status
  + Analog audio output with 8 ohm speaker driver and digital volume control
  + Analog input for playing external audio to the speaker
* Text – to – speech algorithm:
  + Real time conversions for streaming text
  + User customisation for special characters (e.g SMS icons/chat emotes)
  + Support US English

WTS701 – single chi[ text-to-speech processor

* Conversion achieved by processing incoming tezt into phonetic representation mapped to corpus of naturally spoken word parts
* Chip programmed through SPI port (allow dl of diff languages and speaker databases)
* Operating current = 35mA
* Standby current < 1uA
* 3V/5V logic tolerance
* See page 9 of user manual for pin identification and description

KEYPAD

* 20mA at 24V DC
* Resistance = 100 ohm max
* Life expectancy = 10million operations per key
* keypad2.jpg